A New 2-D Exact Moment Recovery With Application To Fast Frequencyresponse Estimation

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Summary

The estimation of a system's frequency response, and hence of its transfer function, is of great practical importance in signal processing, identification and control. The powerful quadrature correlation technique is very well-suited for this situation task and is still enjoying a widespread use because of its ease of use, excellent harmonic and noise rejection capabilities. Its practical implementation ranges from the purely repetitive, single frequency version to the fully parallel multifrequency one. The latter version is superior to the former one in terms of speed of estimation but suffers form tile cost of its parallel structure that becomes more prohibitive as the number of parallel channels increases. To solve this cost problem, a new 2-D exact moments recovery theory is proposed here that allows using signal coding as coarse as 1 bit without sacrificing accuracy. Therefore the cost of using a large parallel structure, and hence a fast multifrequency estimation scheme is no longer prohibitive. The simulation work carried out with some known filters substantiate very well this theory